Canadian Field Print Calculator

Website: http://www.serecon.ca/resources/calculator

Factsheet

General description of the tool

Category	Outcome-based
Objective	- To meet the market demand for information on sustainable production - To enable producers to see their individual performance on sustainability impact areas in comparison to (1) regional averages, (2) his own farm over time and (3) his own farm under alternative management scenarios
Geographical applicability	Prairie Provinces and Ontario
Functionalities	Hotspots identification, alternative scenarios testing, soil carbon sequestration calculations, provide a footprint value/metrics
Target audience	Farmers and food supply chain managers
Developers	Serecon - latest update: 2015
Format	Excel spreadsheet to download (pilot)
Cost (tool and data)	Free (at the moment, available to producers in pilot workshops)
Past or current users	Participants of the initiative: Canadian Canola Growers Association, Canadian Association of Agri-Retailers, Pulse Canada, General Mills, Grain Farmers of Ontario, Enns Brothers, Prairie Oat Growers Association, Syngenta, Manitoba Pulse Growers Association, Farmers Edge, CropLife Canada, AgriTrend, Canadian Fertilizer Institute, Ducks Unlimited Canada

Commodities covered

Canola, pea, lentil, soybean, wheat

BMPs covered

Reduced tillage practices
Crop rotation, incorporating perennial or pulse crops
Fertilizer application - source
Application method - conventionally tilled land
Cover crops
Fertilizer application - rate
Fertilizer application - timing
Application rate based on testing and book values*

**modelled partially (i.e. cannot be customized for a specific manure cont*

Indicators covered

GHG emissions
Land use
Soil erosion
Energy use

Data inputs

Data requirements	Primary data required	Default values
Environmental conditions	Farm ID, province, legal land location, field size, soil data (surface form, slope class, observed wind erosion, soil type and surface soil texture), tillage (current and previous practices) and wetland drainage history (acres not seeded until June 15, acres drained, acres drained last 5 years)	n/a - no default value
Crop management	- Crop rotation: frequency, yield, crop prior year - Field operations: hours for operations, tractor used, fertilizer application (NPK rates, tractor used), manure (application method, tractor used), pesticide (sprayer) - Harvest: swather use, combine use, type of crop drying, fuel for crop drying, moistude content before drying and after drying	n/a - no default value
Carbon sequestration/storage	No	n/a - no default value
Livestock	No	n/a - no default value
Energy use	Equipment horsepower, running time for operations	n/a - no default value
Primary processing	No	n/a - no default value
Water	No	n/a - no default value
Transport	No	n/a - no default value
Others	No	n/a - no default value

Scope	☑ Farm level	☐ Supply chain
Ease of use for the data collector	Relatively easy, but may require specific documentation - Qualitative data entries can be easily completed by the user. Data on crop areas and drainage areas can be easily estimated by the producer. Quantitative data related to fertilizers and pesticides will require the user to search through its documents, but these documents should be accessible. Data on energy use (electricity and fuel) are usually easily accessible to producers, except for swathers fuel use or power (in which case, they usually find the information online).	

Modelling methods

Consistency of the model with the goal and scope of the tool	Consistent - the tool provides crop-specific data on environmental impacts as well as data on environmental impacts on a per unit area basis. The tool is also sensitive to changes over time (to help producers keep track of their performance over time).
Transparency and quality of documentation	Guidance document: Yes - Guidance will be provided in the tool Methodology document: Yes - documentation on the methodology will be available, but most relevant information will be disclosed directly in the tool/output
Conformity of the methodology with the current state-of-the-art agronomic and environment sciences	Consistent - uses primary data that are representative of the region, based on well-developed methodology, and uses the Field to Market FieldPrint work as a reference
Methodology	- GHG emissions calculation based on Holos methodology - Soil organic carbon change (SOCC): methodology developed by AAFC (not crop-specific) - Soil erosion: methodology developed by AAFC (crop-specific) using Canadian soil data and algorithms (AAFC's Soil Erosion Risk Indicator) - Land use: calculated from Census of Agriculture crop areas and production data (reported in Statistics Canada's Field Crop Reporting Series) - Soil loss: methodology (SoilERI) developed by the National Agri-Environmental Health Analysis and Reporting Program (NAHARP) - Energy use: same methodology as Western Canada Energy Use Indicator (Pulse Canada et al. 2011) - Climate Impact: same methodology as Western Canada Energy Use Indicator (Pulse Canada et al. 2011) - Nitrous oxide emissions: IPCC Tier 2 methodology
Dataset sources used for modelling	Primary data were taken from the 2011 Census of Agriculture data (Canada), CANSIM and National Resource Inventory (NRI) of the US National Resources Conservation Service (NRCS).

Outputs / Results

Results	☑ Detailed summary of results in tables	☑ Detailed summary of results in graphs	
Analysis	☑ Summary of main hotspots	☑ Comparison with alternative scenario	☑ Full report with background information on the indicators asses

Limits of the tool/model

There may be an overestimation of nitrous oxide emissions from the residues of peas and lentils as the model assumes that fixed nitrogen in the crop residues of grain legumes, such as peas and lentils, contributes to nitrous oxide emissions in the same way as nitrogen in other crop residues, e.g. wheat.

There are significant uncertainties regarding the fertilizer application rates taken from Yang et al., 2007 study, for the analysis of climate impact from crop production in Canada.